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R. Jordan
05/07/04

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**
**Before the Board of Patent Appeals and Interferences**

In re Patent Application of

O'CONNELL

Serial No. 09/286,469

Filed: April 6, 1999

Atty Dkt.: 922-48
C# M#

TC/A.U.: 2665

Examiner: T. Tran

Date: April 30, 2004

Title: ORGANIZATION OF DATABASE IN NETWORK SWITCHES FOR PACKET-BASED DATA COMMUNICATION NETWORKS



Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

☐ **Correspondence Address Indication Form Attached.**

☒ **NOTICE OF APPEAL**
Applicant hereby **appeals** to the Board of Patent Appeals and Interferences from the last decision of the Examiner. ($ 330.00 ) $ 330.00

☒ An appeal **BRIEF** is attached in triplicate in the pending appeal of the above-identified application ($ 330.00) $ 330.00

☐ Credit for fees paid in prior appeal without decision on merits -$ ( )

☐ A reply brief is attached in triplicate under Rule 193(b) **(no fee)**

☐ Petition is hereby made to extend the current due date so as to cover the filing date of this paper and attachment(s) **($110.00/1 month**; $420.00/2 months; **$950.00/3 months**; $1480.00/4 months) $

**SUBTOTAL** $ 660.00

☐ Applicant claims "Small entity" status, enter ½ of subtotal and subtract -$( )
☐ "Small entity" statement attached.

**SUBTOTAL** $ 660.00

Less month extension previously paid on -$( 0.00)

**TOTAL FEE ENCLOSED** $ 660.00

Any future submission requiring an extension of time is hereby stated to include a petition for such time extension. The Commissioner is hereby authorized to charge any deficiency, or credit any overpayment, in the fee(s) filed, or asserted to be filed, or which should have been filed herewith (or with any paper hereafter filed in this application by this firm) to our **Account No. 14-1140.** A duplicate copy of this sheet is attached.

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By Atty: Raymond Y. Mah, Reg. No. 41,426

05/07/2004 FDELOATC 00000001 141140 09286469
01 FC:1251 110.00 DA

Signature: Raymond Mah

05/04/2004 WABDELR1 00000005 09286469
01 FC:1401 330.00 OP

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE


In re Patent Application of

O'CONNELL

Serial No.: 09/286,469

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Atty. Ref.: 922-48

Group Art Unit: 2665

Examiner: Tran, T.

For: ORGANIZATION OF DATABASES IN NETWORK SWITCHES FOR PACKET-BASED DATA COMMUNICATION NETWORKS

April 30, 2004



**APPEAL BRIEF**

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Appellant hereby appeals the Final Rejection of December 31, 2003, Paper No. 12.

## REAL PARTY IN INTEREST

The real party in interest is the assignee, 3Com Technologies, a corporation of the Cayman Islands.

## RELATED APPEALS AND INTERFERENCES

The Appellant, the undersigned, and the assignee are not aware of any related appeals or interferences which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

## STATUS OF THE CLAIMS

Claims 1, 2, 4-7 and 9-12 remain pending in this application. Claims 1, 2, 4-7 and 9-12 stand rejected by the Examiner, the rejections of which are appealed. No claim has been substantively allowed.

## STATUS OF ANY AMENDMENT FILED SUBSEQUENT TO FINAL REJECTION

No Amendment has been filed subsequent to the Final Rejection. The claims as presented in the appendix to this brief are as amended by the Amendments filed August 27, 2002 and October 9, 2003.

## CONCISE EXPLANATION OF THE INVENTION

Exemplary embodiments of the invention relate to a network switch for a packet-based data communication network. The network switch includes a plurality of ports for receiving and transmitting data packets and a database for controlling passage of the data packets between the plurality of ports. As shown in Fig. 4 of the application, the database includes a first data table 16 and a second data table 17. Data table 16 is accessible by means of a hash function 15 performed on a received data packet having a network (IP) address. Data table 16 contains entries each comprising, inter alia, a network address 162 and an associated pointer 163. Data table 17 contains entries each comprising a media access control (MAC) address and a port identification. Data table 17 does not, however, contain the network addresses.

Each of pointers 163 in data table 16 points to an entry in data table 17. A plurality of entries in data table 16 can point to the same MAC address in data table 17. Pointers from

various different network addresses in one data table may thus point to the same MAC address in another data table. A more compact storage of data may therefore be accomplished as redundant storage of common MAC data for different network addresses may be avoided.

## CONCISE EXPLANATION OF THE ISSUE PRESENTED FOR REVIEW

Whether claims 1, 2, 4-7 and 9-12 are patentable under 35 U.S.C. §102(b) as not having been anticipated by Onishi et al (U.S. Patent No. 5,434,863, hereinafter "Onishi").

## WHETHER THE CLAIMS STAND OR FALL TOGETHER

Claims 1, 6 and 9-12 stand or fall together and do not stand or fall with any other claims.

Claims 2, 4, 5 and 7 stand or fall together and do not stand or fall with any other claims.

## ARGUMENTS WITH RESPECT TO THE ISSUES PRESENTED FOR REVIEW

Claims 1, 2, 4-7 and 9-12 are patentable under 35 U.S.C. §102(b) as not having been anticipated by Onishi.

For a reference to anticipate a claim, each element must be found, either expressly or under principles of inherency, in the reference. Onishi fails to disclose each element of the claimed invention. For example, Onishi fails to disclose "a data table for holding data entries each comprising a media access control address and an identification of a port," and "a hash table accessible by hashing at least part of respective network addresses of received data packets, said table having entries each comprising a network address and an associated pointer to an entry in the said data table" as required by independent claim 1 and claim 2 which depends therefrom.

The Office Action alleges that col. 10, lines 40-50, col. 11, lines 30-40[1] and Fig. 14 of Onishi discloses a data table "for holding data entries each comprising: a hasing (sic) table pointing to the table of network address and port number and a pointer table of which the entries each comprise a network address and an associated pointer to an entry in the data table, which comprises media access control address and an identification of a port." (See page 2, lines 17-21 of the Office Action). Appellant disagrees.

First, the Office Action refers to a (hashing) "table pointing to the table of network address and port number." The Examiner has misunderstood claim 1. Claim 1 requires that the hash table has a pointer "to an entry in the said data table", which is the table holding data entries each comprising a media access control address and an identification of a port.

Fig. 14 of Onishi shows table 400 including a network address and a pointer 405 "for next-entry." Col. 10, lines 40-50 of Onishi contain no information concerning the significance of the pointer. Col. 10, line 59 of Onishi indicates that the pointer 405 is "for the next entry in the routing information (Step 1706)." Pointer 405 is merely pointing to **another entry in the same table, not a separate table containing MAC addresses and port identifiers**. This can be clearly seen from Fig. 17 in which step 1701 refers to the accessing of the routing table (col. 10, line 42). Pointer 405 is a pointer which is required when two or more network addresses hash to the same value, **i.e. it is an internal link pointer, not a pointer to another table**.

Accordingly, the present invention relates to a data table (accessed by hashing) having entries which each point to another data table having entries which comprise MAC addresses and

[1] Appellant has attached a portion of "Computer Networking: A Top Down Approach Featuring the Internet" which may be relevant in understanding col. 11, lines 30-40 of Onishi. In particular, Fig. 5.20 and associated text describes an ARP protocol and an ARP mapping table which shows entries each including an IP address and a LAN (MAC) address as well as a time to live (TTL).

respective port identifiers. In contrast, Onishi discloses a table with network addresses and port numbers and a link pointer to some place in the same table. If anything, Onishi's pointer 405 relates to link pointer 164 which points to another entry in the same table 16 rather than pointer 163 of database 16 which points to an entry in another data table 17 (see Fig. 4 of the application).

Col. 11, lines 30-40 of Onishi refer in general terms to the technique of mapping the IP (network) to a MAC address using the address resolution protocol. This is performed after the routing information has been stored in a buffer 203 and is performed by a separate processor 306 (col. 11, line 36). This protocol is a well-known mechanism of discovering the next physical address required for a packet for which the network destination address is known but the next physical address is not. As is well known, the address resolution protocol requires the broadcasting of packets with the destination network address and the reception of a reply which includes the media access control address. Col. 11, lines 39-42 of Onishi states "the address mapping assisting section 304 maps the network address (IP address) on the physical address (MAC address) to post this effect to the low rank processor 306 (Step 1802)." Col. 11, lines 47-52 goes on to say "the mapping table used for mapping the IP address on the MAC address is previously prepared and the mapping process is performed using this mapping table, or the learning type mapping table in which the result by the ARP protocol is registered is organized to perform the mapping processing." The passage is completely silent concerning the physical organization of such a mapping table. In any event, such mapping tables have entries each consisting of a network address, a MAC address and a TTL (time to live) entry.

Claim 2 depends from claim 1 and further requires that pointers associated in a hash table with network addresses and which share a common media access control address in the switch all identify a single common entry in another data table. With respect to this feature, the Office Action asserts that "Onishi discloses a network switch having the pointers associated in said pointer table with network (sic). See col. 10 lines 20-30.." (See page 2, last two lines of the Office Action). However, col. 10 lines 20-30 of Onishi make no reference to any hash table, no reference to any media access control addresses and no reference to the identification of a single common entry in such a data table. This portion of Onishi merely discloses the operation of a low rank processor which performs "buffer management" such as monitoring an empty buffer state along the flow from a low rank to a high rank and what should happen if a packet is not discarded.

Independent claim 4 requires, *inter alia*, responding to a network address of an incoming packet to access a pointer table of address pointers that identify an entry in another data table. With respect to this feature, the Office Action misapplies Onishi in a manner similar to that discussed above with respect to claim 1. In particular, pointer 405 in Onishi's table 400 points to an entry in the same table.

Claim 4 further requires "causing the address pointers for all the network address of remote stations coupled to the switch by way of the same intermediate device to identify a single common entry for that device in said data table." Onishi fails to disclose this feature. The Office Action apparently alleges that col. 10 lines 15-40 discloses this feature. Appellant respectfully disagrees. There is no such disclosure of causing the address pointers for the network addresses

to identify a single common entry in another data table anywhere in this identified portion of Onishi.

Claim 5 depends from claim 4 and is thus deemed allowable for the reasons discussed above with respect to claim 4.

Independent claim 6 requires "a second data table containing entries comprising forwarding data including a destination media access control address," and "said entries in the first data table each include a pointer to an entry in said second data table." The Office Action apparently alleges that col. 11, lines 30-45 discloses these features. Appellant disagrees. No such disclosure can be found in this section as discussed above in connection with claim 1.

Claim 7 depends from claim 6 and further requires a network switch wherein the pointers associated in a first data table network addresses which share a common media access control address all identify a single common entry in a second data table. No such disclosure can be found in Onishi. The Office Action apparently alleges that Fig. 14 of Onishi discloses this feature. (See page 4, line 12 of the Office Action). Appellant disagrees. As indicated above, pointer 405 is the only pointer used in this table and it does not point to a second data table. Pointer 405 is an internal link pointer which points to an entry in the same data table.

Independent claim 9 requires "said first data table holds data entries each comprising a network address and a pointer to an entry in said second data table." As discussed above, Onishi's pointer 405 is an internal pointer that points to an entry in the same table not a second data table and thus fails to disclose this feature recited in claim 9. The Office Action alleges that "said second data table contains data entries each including a destination media access control address and an identification of a port" is disclosed by Onishi. Appellant disagrees. No such

table is disclosed in Onishi. Since Onishi places his destination port number in the network address table (see item 404), not the media access control address table, Onishi cannot disclose this feature.

Claims 10-12 each requires a first data table holding data entries each comprising a network address and a pointer which points to an entry in a second data table containing entries including a MAC address and a port identifier. Accordingly, Appellant submits that Onishi fails to disclose all of the limitations required by claims 10-12 for at least reasons similar to those discussed above with respect to claim 1.

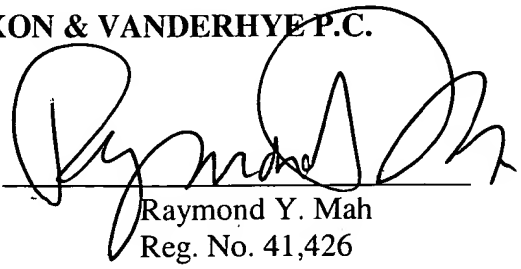
In view of the foregoing, it is respectfully submitted that claims 1-2, 4-7 and 9-12 are patentable as not having been anticipated by Micka.

## CONCLUSION

For all of the reasons set forth above, it is respectfully requested that this appeal be granted and that the rejections discussed above be reversed.

Respectfully submitted,

**NIXON & VANDERHYE P.C.**

By: 

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**APPENDIX OF CLAIMS ON APPEAL**

1. A network switch for a packet-based data communication network comprising a plurality of ports for the reception and transmission of data packets and means for establishing a database for controlling the passage of data packets between the ports, the database comprising a data table for holding data entries each comprising a media access control address and an identification of a port, and a hash table accessible by hashing at least a part of respective network addresses of received data packets, said hash table having entries each comprising a network address and an associated pointer to an entry in the said data table and in which said data table does not hold said network addresses.

2. A network switch according to claim 1 wherein the pointers associated in said hash table with network addresses which share a common media access control address in said switch all identify a single common entry in said data table thereby reducing the space required for the database by avoiding redundant storage of common media access control addresses.

4. A method of operating a network switch in a packet-based data communication network, wherein the network switch has a multiplicity of ports each connected to a respective group of remote stations by way of an intermediate network device, the network switch responding to network addresses in packets received by the network switch to look up in a data table a media access control address for the respective intermediate device, said method comprising:

(a) responding to a network address of an incoming packet to access a pointer table of address pointers identifying an entry in said data table;

(b) storing network address entries in the pointer table and not in the data table; and

(c) causing the address pointers for all the network addresses of remote stations coupled to the switch by way of the same intermediate device to identify a single common entry for that device in said data table.

5. A method according to claim 4 wherein the step (a) includes hashing the network addresses to access the pointer table.

6. A network switch for a packet-based data communication network, comprising a plurality of ports for the reception and transmission of data packets which include network address data and media access control address data, comprising:

a database for controlling the passage of data packets between the ports, the database comprising a first data table for holding data entries each comprising a network address; and

means for hashing network address data of said packets to access said first data table; and

further comprising a second data table containing entries comprising forwarding data including a destination media access control address; wherein:

said entries in the first data table each include a pointer to an entry in said second data table and said second data table does not include network address data.

7. A network switch according to claim 6 wherein the pointers associated in said first data table with network addresses which share a common media access control address in said switch all identify a single common entry in said second data table.

9. A network switch for a packet-based data communication network, comprising a plurality of ports for the reception and transmission of data packets which include network address data and media access control address data, comprising:

a database for controlling the passage of data packets between the ports, the database comprising first and second data tables, wherein:

network address data and media access control data are held separately in different ones of said first and second data tables;

said first data table holds data entries each comprising a network address and a pointer to an entry in said second data table; and

said second data table contains data entries each including a destination media access control address and an identification of a port;

whereby different entries in said first data table can contain pointers to the same data entry in said second data table thereby avoiding redundant storage of common media access control data for different network addresses.

10. A network switch for a packet-based data communication network, comprising a plurality of ports for the reception and transmission of data packets which include network address data and media access control address data, comprising:

a database for controlling the passage of data packets between the ports, the database comprising first and second data tables, wherein:

said first data table is accessible in response to network address data in said data packets and holds data entries each comprising a network address and a pointer to an entry in said second data table; and

said second data table contains data entries each including a destination media access control address and an identification of a port and not including network addresses;

whereby different entries in said first data table can contain pointers to the same data entry in said second data table.

11. A network switch according to claim 10 and further comprising hashing said network address data in said packets to access said first data table.

12. A network switch for a packet-based data communication network, the switch comprising a plurality of ports for the reception and transmission of data packets that include network address data and media access control data and a database for controlling the passage of data packets between the ports,

the database being accessible by hashing at least a part of the network address of received data packets and including entries for network addresses, media access control addresses and port identification;

wherein redundant entries of common media access control addresses is avoided by having:

a first data table, accessible by said hashing, containing network addresses and associated pointers to an entry in a second table; and

the second table containing the media access control addresses and port identification; and

wherein pointers from network addresses in said first data table having a common media access control address in said switch identify a single common entry in said second table.